piece of white paper. The angle of divergence will be determined by the size of the object to be masured. The image of the object to be measured is projected on the sheet of paper. The paper is moved until the object just fills the space between the lines, and a mark is made across the lines at this point.

A stage micrometer scale is then substituted for the object and is moved along the diverging lines until a number of the divisions exactly cover the space between the lines. This point is marked as before by a cross line. The distance from the intersection of the lines to each of the cross lines is measured, and one has two similar triangles from which a single proportion can be derived in which the size of the object is the one unknown quantity—diameter of object: micrometer divisions:: distance from intersection to object: distance from intersection to micrometer.

MICRO-RADIOGRAPHY

Goby (Comp. Rend. CLVI, pp. 686-8: Trans. in J. R. M. S., Aug., 1913) reports the application of the X-ray to making visible the internal structure of opaque microscopic objects. "It replaces the method of section cutting, which is often slow and costly, and always indirect and destructive of the object, by a method which, whilst rapid and preserving the object itself, reveals sufficient detail to make it only necessary to enlarge the minute radiogram directly obtained, in order to be able to study it with the naked eye with the same facility as an ordinary macro-radiogram."

The difficulty of doing this has arisen in getting the necessary clearness of detail by means of Röntgen rays. This is overcome by an ingenious contrivance which suppresses the secondary or superfluous rays, and insures that the incident rays shall be normal. For details of the apparatus the reader must refer to the citations above. Figures are given which are enlarged (x 19-25) reproductions of micro-radiograms of Foraminifera and of the limbs of a small three-toed lizard. The results are remarkable.

CIRCULATION BY CONVECTION CURRENTS IN LABORATORY AQUARIA

Gemmill (J. R. M. S., June, 1913) describes a simple method for getting a gentle circulation and æration in single or serial small

laboratory aquarium jars. It depends in principle upon a water current some degrees lower than that of the aquaria in the laboratory.

The author recommends tall beakers with about 9 inches of water in them. The current of colder water is carried through a U tube of glass, which is connected with the tap and the sink by rubber tubing. The U tube is of ½-inch tubing, and dips some 4½ inches into the beaker of water. This leaves an equal distance of water in the flask below the U tube.

The cool current flowing through the U tube cools the water in immediate contact with its surface. A downward convection current is thus caused in the middle of the jar. The water at the wall of the jar, exposed to the higher temperature of the laboratory will supply an upward convection current. Enough of the surface water is carried downward in the descending current to insure oxygenation of the whole volume.

For delicate floating larvæ, such as *Asterias,* the author shows that this method is much more satisfactory than streams of air bubbles. The danger of mechanical injury is eliminated, and it is possible to isolate the vessels so as to prevent infection even from the atmosphere. Manifestly a series of U tubes can be used so as to make the same stream serve a whole battery of vessels.

SIMPLE HISTOLOGICAL METHODS

Salkind (J. R. M. S., Aug., 1913, p. 426) has brought together some simplifications of histological methods:

1. *Sublimate fixation*—Instead of removing the salts of mercury by the usual method, the iodine treatment may be carried on during the removal of the paraffin by placing the mounted paraffin sections in xylol saturated with iodine. In order to do this, after fixing in Zenker's or Helly's fluid, the objects are placed in a solution containing 3 per cent potassium bichromate and 1 or 2 per cent hydrochloric acid. If acid solutions are not suitable, use the following instead: Water, 100 c.c.; corrosive sublimate, 4 grms.; potassium bichromate, 2.5 grms.; chloral hydrate, 4 grms.

2. *Aceton-Ether Method of Paraffin Embedding*—Remove tissue from water or weak alcohol and place in a fluid composed as